REMARKS

In the following, the Examiner's comments are included in bold, indented type, followed by the Applicants' remarks. Claims 1-42 were pending prior to the Office Action. In the Office Action, claims 1-42 were rejected and claims 9, 23, and 37 were objected to. In this response, claims 1, 9, 15, 23, 29, and 37 are amended. Claims 1-42 are pending.

Claim Rejections Under 35 U.S.C. § 112

> **Claims 4, 7, 18, 21, 32, and 35 are rejected under 35 U.S.C. 112 because they recite "(1+S), where S is a positive percentage represented as a decimal." It is unclear that S is positive percentage for what kind of values, either for minimum percentage of rows or for any other value. Appropriate correction is required.**

Applicants disagree. S is a percentage, which, by definition is unitless. As the specification states in paragraph 0042, "S may be any positive percentage and may be set by the user or by the system." Specification, ¶ [0042]. Applicants respectfully request that this rejection be removed.

Claim Objections

> **3.   Claim 9, 23, and 37 objected to because of the following informalities: the limitation "determining a reminder number of buckets equal to the total number of <u>buckets less the</u> number of high-bias buckets used" needs grammatical revision. Appropriate correction is required.**

Applicants have amended claims 9, 23, and 37 to address this concern.

Claim Rejections Under 35 U.S.C. § 101

> **Claims 1-42 are rejected under 35 U.S.C. 101 as being directed to non-statutory subject matter. The language of the claims raises a question as to whether the claims are directed merely to an environment or machine which would result in a practical application producing a concrete useful,**

and tangible result to form the basis of statutory subject matter under 35 U.S.C. 101.

Claims 1-42 are rejected because the claims do not recite a practical application by producing a physical transformation or producing a useful, concrete, and tangible results. To perform a physical transformation, the claimed invention must transform an article of physical object into a different state or thing. Transformation of data is not a physical transformation. A useful, concrete, and tangible results must be either specifically recited in the claim or flow inherently therefrom. To be useful the claimed invention must establish a specific, substantial, and credible utility. To be concrete the claimed invention must be able to produce reproducible results. To be tangible the claimed invention must produce must produce a practical application or real world result.

To expedite a complete examination of the instant application the claims rejected under U.S.C. 101 (nonstatutory) above are further rejected as set forth below in anticipation of application amending these claims to place them within the four categories of invention.

Applicants have amended the independent claims to recite the useful, concrete, and tangible result of "performing query optimization based, at least in part, on one or more of the zero or more histogram buckets and one or more high-bias buckets." Applicants respectfully request that this rejection with withdrawn.

Claim Rejections Under 35 U.S.C. § 102

Claims 1-2, 14-16, 28-30, and 42 are rejected under 35 U.S.C. 102(b) as being anticipated by Kuorong Chiang (Chiang hereinafter) (U.S. Patent No. 6,477,523).

With respect to claim 1, Chiang teaches "a method for representing statistics about a table including one or more rows, each row including a respective value, the method including" as an article of manufacture for generating statistics for use by a relational database management system (Chiang Abstract).

"creating zero or more histogram buckets, each histogram bucket including a width representing a respective range of values and a height representing a count of rows having values in the range of values" as in the preferred embodiment, data partitioning and repartitioning may be

performed, in order to enhance parallel processing across multiple AMPs 116. For example, the data may be hash partitioned, range partitioned, or not partitioned at all (i.e., locally processed) (Chiang Col 5, Lines 25-39). Wherein the ModeFreq field in the equal-heights interval represents a number of rows having a modal value (Chiang Col 10, Lines 20-22).

"creating one or more high-bias buckets, each high-bias bucket representing one or more values that appear in a minimum percentage of rows" as the compressed histogram includes both equal-height intervals and high-biased intervals (Chiang Abstract). Count of rows is stored in ModeFreq for the first Loner and is stored in the rows field for the second loner. Loner is a distinct values that is stored in a high-biased interval (Chiang Col 4, Lines 6-10). Examiner interprets loner values as having minimum percentage of rows, which are stored in high biased interval.

With respect to claim 2, Chiang teaches, "a total number of buckets is a fixed number equal to the sum of the number of histogram buckets and the number of high-bias buckets" as the compressed histogram includes both equal-height intervals and high-biased intervals (Chiang Abstract).

With respect to claim 14, Chiang discloses the method of claim 1, where a total number of buckets is equal to the sum of a number of the histogram buckets and a number of the high-bias buckets, where the total number of buckets is fixed, where the number of high-bias buckets is fixed, and where the method includes: as the compressed histogram includes both equal-height intervals and high-biased intervals (Chiang Abstract).

"populating the one or more high-bias buckets with the FH most frequently occurring values, where F is a number of values each high-bias bucket can store and H is the number of high-bias buckets; and populating the one or more histogram buckets with all other values" as the compressed histogram includes both equal-height intervals and high-biased intervals (Chiang Abstract). The Values field represents the number of loners in the interval (Chiang Col 9, Lines 66-67). Compressed histogram is an array of intervals, which comprises high-biased or equal-height intervals, or both. In the latter situation, high-biased intervals are ordered before the equal-height intervals (Chiang Col 4, Lines 17-20).

Claims 15-16, 28-30, and 42 are essentially the same as claims 1, 2, and 14 except they set forth the claimed invention as a system and a computer program and are rejected for the same reasons as applied hereinabove.

Applicants disagree. Claim 1 requires, in part, "creating zero or more histogram buckets, **each histogram bucket including a width representing a respective range of values** and a

height representing a count of rows having values in the range of values." Chiang does not disclose the creation of histogram buckets as required by claim 1. The first portion of Chiang cited to show this limitation discusses partitioning data across AMPs (Chiang, 5:25-39). None of the cited discussion in Chiang makes any mention of any data structure that includes a width and height value.

Chiang does, however, discuss database statistics. In particular, Chiang discusses "[a] global aggregate spool [that] includes: (1) a distinct value from the partition of the subject table and (2) the number of rows in the partition of the subject table having the distinct value." Chiang, 6:58-62. The entries in Chiang's "global aggregate spool" are not histogram buckets as required by claim 1. The claim limitation requires that the histogram buckets include "**a width representing a respective range of values**." Because the entries in Chiang's "global aggregate spool" include only "**a distinct value** from the partition of the subject table," it cannot represent "a range of values," as required by claim 1.

Chiang also discusses high-biased and equal height intervals that are derived from the entries in Chiang's global aggregate spool. Chiang, 3:6-65, 7:40-52. Neither of Chiang's high-biased intervals or equal-height intervals include "a width representing a **respective range of values**," as required by claim 1. Instead, Chiang's intervals include a mode (the "[m]ost frequent value in the interval.") and a "MaxVal" (the "[m]aximum values covered by the interval"). Chiang, 3:25-65. Neither of Chiang's high-biased intervals or equal-height intervals include a minimum value represented by the intervals and therefore neither of the intervals include the a width representing a "**respective range of values**" represented by the interval. Chiang, therefore, does not disclose a histogram bucket that includes "**a width representing a respective**

range of values." Claim 1 is therefore patentable over Chiang. Independent claims 15 and 29 include similar limitations, which are similarly not disclosed by Chiang.
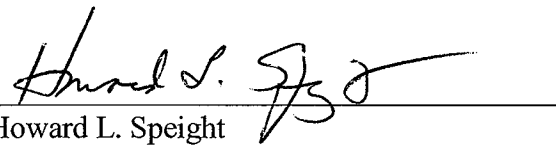
Each of the remaining claims depends from one of claims 1, 15, or 29 and is patentable for the reasons presented above.

SUMMARY

In light of the above remarks, reconsideration and withdrawal of the outstanding rejections is respectfully requested. It is further submitted that the application is now in condition for allowance and early notice of same is requested. Should the Examiner have any questions, comments, or suggestions in furtherance of the prosecution of this application, the Examiner is invited to contact the attorney of record by telephone, facsimile or electronic mail, as set out below.

Applicants believe that no fees are due with the filing of this Response. Should the Commissioner deem that additional fees are due, Applicants respectfully request that the Commissioner accept this as a Petition Therefore, and direct that any and all fees due are charged to NCR **Deposit Account No. 14-0225**, Order Number **11303**.

Respectfully submitted,

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